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EXAMINER	
REKSTAD, ERICK J	
ART UNIT	**PAPER NUMBER**
2613	

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/552,761	ECKART, STEFAN	
	Examiner	Art Unit	
	Erick Rekstad	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 May 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8,11-25 and 27-32 is/are pending in the application.

4a) Of the above claim(s) 6-8 and 11-18 is/are withdrawn from consideration.

5)☒ Claim(s) 5, 27 and 30-32 is/are allowed.

6)☒ Claim(s) 1-4,19-25,28 and 29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

This is a non-final action for application 09/552,761 in response to the election filed on May 25, 2005 in which claims 1-5 and 19-32 are elected for examination.

Response to Arguments

Applicant's arguments filed November 3, 2004 have been fully considered but they are not persuasive.

In regards to the rejection of claims 1, 2, 28 and 29 as anticipated by Chen the Applicant's arguments are not persuasive. Applicant argues that claim 1 explicitly recites frames in the plural, and therefore the number of bits generated is constant over more than one frame. The claim requires "over a first given number of frames" which does not preclude the given number of frames being one. Further, Chen teaches the quantizer step value is constant for a SGOP. Chen provides an example of a SGOP which contains 2 frames as shown in Figure 1. Therefore the claims are too broad and should be amended to overcome the prior art.

The applicant further argues that Chen does not teach the incrementing of the frame and calculating a second quantizer step size such that a second number of bits generated at the output of the constant-bit-rate finite-buffer-size video encoder is constant over a second given number of frames starting at the incremented current frame. The applicant argues on page 3:

> As shown in Fig. 1, and as explicitly required in Chen at Col. 4, lines 47 through 62, the first SGOP contains frame 1 and 2, while the second SGOP contains frames 3 and 4. Incrementing the current frame in the first SGOP (frame 1), results in the next incremental frame (frame 2). However, the first frame in the second SGOP is frame 3 and therefore, frame 3 cannot be the next incremental frame after frame 1, since the next frame after frame 1 would be

> frame 2. As a result, Chen teaches calculating a first quantizer step size and a second quantizer step size, based on completely separate non-overlapping SGOPs, whereas claims 1 and 28 calculate a first quantizer step size starting at the current frame, and the second quantizer step size starting at the incremented current frame.

Claims 1 and 28 do not require the incrementing of the frame by one frame. Therefore the current frame can be incremented by any number of frames. Further the claims do not require the number of frames (first SGOP) using the first quantizer step size to overlap the number of frames (second SGOP) using the second quantizer step size as suggest by the applicant in the above argument. As shown, Chen teaches all the limitations of claims 1, 28 and dependent claim 2. Therefore the claims are too broad and should be amended to overcome the prior art.

In regards to the applicant's argument related to claim 28, the applicant states that Chen does not teach the obtaining of a quantizer step size in a single pass. The applicant further cites several steps Chen uses to perform the encoding process. It is unclear how the cited sections of Chen relate to the quantizer step size. Further, Chen teaches that the quantizer matrix contains the values for quantizer threshold and step size (Col 5 Lines 63-68). As stated in the previous office action, Chen teaches the selection of the quantizer matrix in a single pass (Col 10 Lines 20-30). Therefore Chen teaches all the requirements of claim 28 and dependent claim 29.

In regards to the applicant's arguments related to the rejection of claims 1-3, 19 and 21-24 as being anticipated by Uz, the arguments are not persuasive. The Applicant argues that the examiner has improperly equated the quantizer step size in the claims with the quantization scale factor of Uz. Uz teaches the quantizer step size is the result

of the product of a weighting matrix and a quantization scale factor (Col 14 Lines 63-67). As Uz teaches producing a quantization scale factor for a frame and the weighting matrix is unchanged the quantizer step size is therefore a constant for the frame (Col 11 Line 40-Col 12 Line 8). The Applicant further argues that Uz does not teach the incrementing of the current frame and calculating a second quantizer step size. As stated in the rejection, Uz teaches the first quantization (Col 11 Lines 40-49), Uz then increments the frame (Col 11 Lines 50-53), Uz finally calculates a second quantization (Col 11 Lines 60-67). Therefore Uz satisfies all the requirements of claims 1 and 2.

In regards to the Applicant's arguments related to claim 3, the Applicant argues that Uz does not teach "adjusting a number of bits in a second frame based on the power value for the first frame." Uz clearly teaches the use of a power value (TA) for a first frame used to adjust the bits for a second frame (Col 11 Lines 11-50). As shown by the citation, Uz teaches the bits for a second frame are set to a default when a Scene Change is detected (Col 11 Lines 40-50). The scene change is determined based on the TA value (Col 11 Lines 22-37). Therefore Uz satisfies all the requirements of claim 3.

In regards to the Applicant's arguments related to claim 19, the Applicant argues that Uz does not teach "using the scene change indication to reset a global complexity history; and using the global complexity history to provide the rate control for the video encoder." It is further argued that Uz merely calculates the rate control quantization scale factor. As stated in the rejection, TAi is the global complexity history used by Uz (Col 11 Lines 16-17). The global complexity history is used to provide the rate control

which is the quantization scale factor (Col 11 Line 61-Col 12 Lines 9). Therefore it is viewed by the examiner that Uz satisfies the requirements of claim 19.

In regards to the Applicant's arguments related to claims 21, 22 and 23, the Applicant argues that Uz does not teach a power value. Applicant is silent on why the average total activity (TAi) is not a power value. As viewed by the examiner TAi is a power value as it describes the strength of the activity. Therefore it is viewed by the examiner that Uz satisfies the requirements of claims 21, 22 and 23.

Applicant's arguments with respect to claim 24 and 25 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 28 and 29 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by US Patent 5,241,383 to Chen et al.

[claims 1 and 28]

Chen teaches a method for rate control for a constant-bit-rate finite-buffer-size video encoder comprising the steps of:

Calculating a first quantizer step size such that a first number of bits generated at an output of the constant-bit-rate finite-buffer-size video encoder is constant over a first given number of frames (SGOP) starting at a current frame;

Incrementing the current frame (to next SGOP); and

Calculating a second quantizer step size such that a second number of bits generated at the output of the constant-bit-rate finite-buffer-size video encoder is constant over a second given number of frames starting at the incremented current frame (Abstract, Col 3 Lines 52-56, Col 5 Lines 28-31, Col 10 Lines 20-51, Col 12 Lines 3-22). Chen further teaches the quantizer is obtained in a single pass as required by claim 28 (Col 10 Lines 20-30).

[claim 2 and 29]

Chen teaches using a second given number of frames that is equal to the first given number of frames (Col 1 Lines 41-42).

Claims 1 rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 6,535,251 to Ribas-Corbera.

[claims 1 and 28]

As shown in Figure 6, Ribas-Corbera teaches the calculating a first quantizer step size such that a first number of bits generated at an output of the constant-bit-rate finite-buffer-size video encoder is constant over a first given number of frames starting at a current frame (step 140 and 150, Fig. 6). Ribas-Corbera further teaches the incrementing the current frame (step 170) and calculating a second quantizer step size such that a second number of bits generated at the output of the constant-bit-rate finite-

buffer-size video encoder is constant over a second given number of frames starting at the incremented current frame (step 140) (Col 6 Lines 18-23 and Lines 62-67, Col 7 Lines 44-47, Col 10 Lines 1-9). Note, Ribas-Corbera further teaches the quantization step can be computed after every frame or after every group of frames (Col 7 Lines 33-35).

Further, Ribas-Corbera teaches the calculating in a single pass as required by claim 28 (Col 6 Lines 24-29).

[claims 2 and 29]

As shown above for claim 1, Ribas-Corbera teaches the quantization step can be computed after every frame or after every group of frames (Col 7 Lines 33-35). Using the technique for every frame would provide the same number of frames for each quantizer step size as required by claim 2.

[claim 3]

As shown in Figure 6, Ribas-Corbera teaches the quantization step size is based on the calculated power values from a previous frame (step 140, Fig. 6) (Col 4 Lines 35-53, Col 6 Lines 18-30).

Claims 1-3,6-8, 11-19 and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,686,963 to Uz et al.

[claim 1]

Uz teaches the use of a quantizer step size to control the number of bits used to encode each macroblock (Col 2 Lines 52-58). Uz also states that by adjusting the quantization step size the bits for a frame in a GOP can be set (Col 12 Lines 4-9). It is

clear that the quantizer step size (Qn) can be calculated such that a first number of bits generated at an output of the constant-bit-rate finite-buffer-size video encoder is constant over a first given number of frames (GOP) starting at a current frame and that the quantizer step size can be calculated for a second given number of frames (Col 12 Lines 56-60). Note Col. 11 Lines 40-47, where an initial quantizer step (default) will allow for x bits to be distributed over an I frame, (or P or B). This meets the limitation of a first quantizer step for a fixed rate over a first given number of frames. Then in Col. 11 Lines 60- Col. 12 Line 6 a new quantization scale is calculated for a new given number of frames (be it I, P or B) and continues to update.

[claim 2]

Uz use of the quantization stepsize to adjust the bits for a frame in a GOP clearly shows that the quantization stepsize can be calculated over a GOP and then calculated again for a GOP of the same size (Col 1 Lines 50-51,Col 12).

[claim 3]

Uz teaches the use of a power value (total activity (TA)) for a first frame used to adjust the bits for a second frame (Col 11 Lines 11-50). As shown by the citation, Uz teaches the bits for a second frame are set to a default when a Scene Change is detected (Col 11 Lines 40-50). The scene change is determined based on the TA value (Col 11 Lines 22-37). Note, TA was equated to meet the power limitation. Applicant's own specs (page 27) appears to teach that power is fully based on complexity. Thus, the TA meets the power limitation.

[claim 19]

Uz describes the detection of a scene change using a prediction error image and using the scene change to reset the global complexity history TAi (Col 11 Lines 50-56). TAi is used to provide the rate control (rate control quantization scale factor) for the video encoder (Col 11 Line 61-Col 12 Line 10). (Col 11 Line 10-Col 12 Line 10).

[claims 21-23]

Uz teaches in figure 1a, the apparatus for rate control for a constant-bit-rate finite-buffer-size video encoder comprising a preprocessing stage (20) for determining a power value (TA) (Col 8 Lines 32-67, Col 9 Lines 1-10) and a group-of-pictures-level rate control block (30) operatively coupled to the preprocessing stage to receive the power value and to provide a target quantizer step size used to provide rate control for the video encoder (Col. 11 Lines 12-67 and Col. 12 Lines 1-9). Therefore Uz satisfies the requirements of claim 21. Further, Uz teaches the updating of the power value for each subsequent picture being encoded as required by claim 22 (Col. 8 Lines 33-35). Claim 23 is further satisfied as Uz teaches the non-intra frames having sizes based on the expected size of the future intra frames (Col. 11 Lines 41-49).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uz as applied to claim 3 above, and further in view of US Patent 6,226,326 to Mihara.

[claim 4]

Uz's TA variable is a sum of the total activities (sum of the absolute differences of pixel blocks) for all the macroblocks in a frame (Col 8 Lines 51-64). The controller maintains an average TA for the frames of a scene (Col 11 Lines 17-18). Uz does not teach how to calculate the average. Mihara teaches the steps for calculating the power value by calculating a sum of absolute differences between the pixel values in the respective pixel block and the average value. The values are added for each of the plurality of pixel blocks within the first frame to obtain a power value for the first frame (Col 19, Lines 10-20). It would have been obvious to one skilled in the art at the time of the invention to calculate the average for each block or each frame as as taught by Mihara in order to obtain the energy value of the frame.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uz as applied to claim 19 above, and further in view of US Patent 5,724,100 to Kuchibhotla and 'Hierarchical Scene Change Detection in an Mpeg-2 Compressed Video Sequence' to Shin et al.

Uz teaches the use of a method for rate control that obtains a scene change indication from a prediction error image and using the scene change indication to reset a global complexity history and using the global complexity history to provide the rate control for the video encoder. Uz does not teach the method of counting a first number of intra coded pixel blocks in the prediction error image, counting a second number of

non-intra coded pixel blocks in the prediction error image, calculating a ratio of the first number and the second number, comparing the ratio to a threshold to determine a result and using the result as a scene change indication. Kuchibhotla does teach this method as a means to prevent exceeding a coding bit budget (Col 2 Lines 35-58, Col 3 Line 53-Col 4 line 5). It would have been obvious to one skilled in the art at the time of the invention to use the method of Uz in conjunction with the method of Kuchibhotla in order to prevent exceeding a coding bit budget.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,690,833 to Chiang et al.

[claim 24]

As shown in Figure 4, Chiang teaches a method for rate control wherein the method provides a means for determining the distance according to sums of absolute differences (step 410). Chiang further teaches the use of the distance to produce a target quantizer step size for a pixel block (steps 420-440) (Col 8 Lines 27-Col 10 Line 12). Chiang further teaches the use of a computer system to perform the encoding steps (Col 11 Line 58-Col 12 Line 8, Figure 7). Chiang does not teach the specific prediction error image block and picture-level rate control block. It would have been obvious to one of ordinary skill in the art at the time of the invention to divide the method of Chiang into any desired subroutines (blocks) in order for the method to be run by the system of Chiang as it is well known in the art to provide a program with subroutines to perform tasks in order to easily replace or update functions in the program.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uz as applied to claim 24 above, and further in view of US Patent 5,724,100 to Kuchibhotla [claim 25]

Chiang teaches the apparatus of claim 24 as shown above. Chiang further teaches the complexity value (MAD) determining means for all pixel blocks (Col 8 Lines 48-54). Although Chiang fails to teach the determining of intra vs non-intra blocks, Kuchibhotla does teach the determining of intra vs non-intra blocks (Fig. 1 element 134, Col 3 Line 30-Col 4 Line 5). Kuchibhotla further teaches the benefit of half-pel motion estimation to obtain a correct scene change detection (Col 4 Line 64-Col 5 Line10). Since both systems provide constant-bit-rate it would have been obvious to one skilled in the art at the time of the invention to substitute Kuchibhotla's scene change detector into the system of Chiang since the scene change detector of Kuchibhotla has the advantage of accurately detecting scene change for half pixel motion compensation.

Allowable Subject Matter

Claims 5, 27, 30-32 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick Rekstad whose telephone number is 571-272-7338. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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